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FORWARD... FROM UNDER THE SEA

HISTORICAL PERSPECTIVE AND FUTURE VISION OF
SUBMARINE LITTORAL WARFARE

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A paper submitted to the Faculty of the Naval War College in
partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not
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Forward . . . From Under the Sea. Historical Perspective and Future Vision of Submarine Littoral Warfare

Abstract

This paper addresses the role of submarine warfare in today's national security strategy. Analysis of submarine coastal operations during the Pacific War, specifically during the final campaign for the invasion of mainland Japan, provides insight into submarine littoral warfare today. Following the decline of the Soviet Union, U.S. forces have focused on the application of maneuver warfare against emerging regional threats. Undoubtedly, this means control of the littoral regions of the world, where joint forces, including submarines, can influence events ashore. Included within the text is a historical perspective and future vision of submarine littoral warfare as it relates to operational maneuver from the sea.

Thesis:

Operating covertly from under the sea, U.S. submarines enhance the joint operational commander's ability to exercise maneuver warfare by engaging in information warfare, providing power projection, and offering aspects of operational protection for joint forces poised in littoral regions.

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I. Introduction

"The vital economic, political, and military interests of the United States are truly global in nature and scope. In many respects these interests are located across broad oceans, and to a great extent they intersect those of current and emergent regional powers. It is in the world's littorals where the Naval Service, operating from sea bases in international waters, can influence events ashore in support of our interests."¹

The importance of submarines to today's national security strategy is in question.

During the Pacific War, submarines engaged in an intensive commerce attrition campaign designed to sever Japanese lines of communication and force government capitulation.

Moreover, submarines operated in littoral areas to provide operational reconnaissance, protection, and deception services in support of amphibious assaults. During the Cold-War, submarine operations were largely independent, designed to gather intelligence and maintain a technological edge over the numerically superior Soviet fleet. Today, following the decline of the Soviet Union, the importance of expensive nuclear submarines is in question. Now, submarines must prove their worth to national policy makers.

Joint commanders, such as Joint Task Force Commanders (CJTF), will engage emerging regional threats to national security. The national strategy has shifted from containment to engagement and enlargement; engaging economic and security interests abroad and enlarging the community of democratic and free market nations². With fewer forces available, joint commanders will conduct operational maneuvers to place adversaries in untenable positions rather than pursue attrition warfare. Undoubtedly, operations in coastal waters, where Naval Expeditionary Forces can control offshore air and sea approaches, will be critical and submarines must contribute to this effort. The thought of open-ocean submarine engagements has diminished along with the number of U.S. fast attack submarines. Now, a smaller submarine force will counter potential regional threats rather than ex-Soviet intentions. This means that submarines must poise in the littoral.

Critics argue that the fast attack submarine is an expensive relic of the Cold-War. This paper presents a historical perspective and future vision of submarine operations that countermands that viewpoint by promoting the submarine as a versatile tool for joint operational commanders. Submarines engaged in electronic information manipulation and power projection from a clandestine littoral posture can create a rapidly deteriorating situation, with which the enemy cannot cope. This is the essence of maneuver warfare³. Moreover, submarines can quickly interdict blue water forces should that threat emerge. Pacific War operations provide a historical precedent, showing the versatility of submarines that engaged in open-ocean commerce interdiction and supported task force commanders with coastal services.

II. Historical Background

On December 7, 1941, President Roosevelt established the policy of unrestricted submarine warfare against Japan--a key to his Pacific War strategy⁴. At the Casablanca conference of 1943, the President added the policy of unconditional surrender as a desired military end-state. Submarines focused on commerce interdiction, rather than warship destruction⁵. The strategic goal was to weaken the Japanese will to fight and ability to wage war by severing the Japanese sea lines of communication.

Throughout the war, U.S. submarines were engaged in a highly successful attrition war against Japanese shipping. So successful that, by January 1945, enemy seaborne targets were scarce⁶. U.S. forces neutralized the Japanese navy at the Battle of Leyte Gulf in October 1944 and only about 20% (1,925,436 tons⁷) of commerce shipping remained. About two-thirds of submarine patrols during the spring of 1945 failed to sink a single merchant⁸. This prompted a shift in warfare focus to the littoral where submarines hunted

remaining commerce seeking coastal protection⁹. Moreover, the lack of targets made more submarines available for direct support to task force commanders who were engaged in an island hopping campaign. By the end of 1944, U.S. forces were rapidly approaching Japanese home islands¹⁰. The number of submarine littoral operations swelled to meet the great demand for coastal intelligence and to provide protection services for the rapidly advancing task forces. By January 1945, the vast deterioration of the Japanese military prompted the Joint Chiefs of Staff to begin preparations for a final crushing blow to the Japanese¹¹.

III. Operational Design

Admiral Nimitz, Commander Central Pacific Ocean Area, and General MacArthur, Commander Southwest Pacific Ocean Area, formulated courses of action for the final U.S. thrust. Admiral Nimitz favored intensifying the air-sea blockade of Japan and obtaining control of peripheral Japanese positions in Korea, China, and surrounding islands to strangle Japan, perhaps avoiding an invasion¹². But the Joint Chiefs approved General MacArthur's plan, an immediate mainland invasion. His concept of operations¹³ included an extensive air-sea blockade and bombing operations to soften defenses and reduce the enemy's ability to repulse an assault. Amphibious landings would follow to seize the industrial heart of Japan with ground forces. This would force the final capitulation of the government.

The first phase of the campaign, Operations Detachment and Iceberg¹⁴, established bomber and fighter air bases on Iwo Jima and Okinawa respectively to support the bombing operations. Iwo Jima provided a fighter support base and halfway house for B-29 forces approaching from the Marianas. Okinawa served as halfway house and fighter support for

bomber forces approaching from Formosa. Follow-on assaults for the second phase, Operation Downfall, consisted of two subordinate operations, Coronet and Olympic. Olympic called for the amphibious invasion of Kyushu, Japan on November 1, 1945; Operation Coronet called for the amphibious invasion of Honshu in early 1946. General MacArthur was placed in command of the ground forces and Admiral Nimitz coordinated various naval support services.

Admiral Nimitz delegated subordinate campaign planning of submarines to Admiral Lockwood, Commander Submarine Force Pacific (COMSUBPAC). Lockwood's submarine strategy was to maintain pressure on commerce interdiction to reduce Japan's ability to wage war. Moreover, his submarines provided direct support to task force commanders who were charged with conducting amphibious and air assaults. Submarine services included coastal reconnaissance, lifeguarding services, mine detection and laying, and antipicket boat sweeps. Admiral Lockwood's submarines from the Central Pacific Area (TF17), based in Guam and Pearl Harbor, joined in a cooperative effort with Admiral Fife's submarines from the Southwest Pacific Area, based in Brisbane (TF42) and Fremantle (TF71), Australia and Subic Bay, Philippines¹⁵.

IV. Historical Submarine Littoral Applications (January-August 1945)

To improve hunting in light of a shortage of enemy targets, submarines pursued enemy commerce in the littoral where ships clung to shores for protection. In early 1945, operational tempo increased in the shallow water areas of the East China Sea, Sea of Japan, and Yellow Sea to interdict remaining lines of communication from Asia¹⁶. Coastal and shallow water commerce interdiction presented hazards to navigation, but submarine commanders displayed extraordinary seamanship skill despite inadequate coastal navigation

charts. Moreover, submarine commanders overcame the tactical disadvantage of an inadequate shallow water torpedo¹⁷. Most commerce engagements occurred on the surface using deck guns against large vessels. Special boarding parties raided smaller craft¹⁸.

To intensify the air-sea blockade of Japan, aircraft and submarines conducted extensive mining operations throughout coastal regions. Sea-lane mining of shipping routes from the Indonesian and Chinese coasts started in late 1942 and expanded dramatically for the final campaign. A mine warfare analytical team, convened by Admiral Nimitz¹⁹, concluded that mines were most effective when laid in coastal areas to force enemy traffic into U.S. submarine patrol areas. During the last year of the war, extensive mining, by both aircraft and submarines, in the Sea of Japan and Inland Sea²⁰ severely restricted enemy maneuvers against advancing task forces. Mines in the Pacific sank few Japanese ships, but their strategic placement confined enemy combatants to home waters and forced commerce into the arms of U.S. submarines.

Submarine support of amphibious landings of Iwo Jima and Okinawa followed an established formula²¹. Units approached coastal areas to obtain photo reconnaissance, intelligence, and provide weather forecasting services. Sometimes submarines delivered special forces ashore to gain first hand intelligence of coastal defenses²². Despite tenuous communications and physical handling constraints inherent to submarines, the intelligence and hydrographic information obtained was invaluable to the operational planners. To maintain an element of operational surprise and protection during the Iwo Jima and Okinawa assaults, forward deployed submarines neutralized coastal pickets²³-- the destruction of coastal ships that could destroy aircraft or warn enemy defense units. Moreover, submarine mine location with new frequency modulated sonar gear²⁴ provided enough information to divert task forces to safe waters.

Submarines conducted missions deep in Japanese littoral areas as well as supported amphibious assaults directly. During the Iwo Jima assault, submarines conducted operational deception through a series of diversionary sweeps toward the Japanese Inland Sea²⁵. This led Japanese naval units away from the objective. Later, during the Okinawa assault, U.S. wolfpacks stood guard at the western exit of the Japanese Inland Sea, Bungo Suido²⁶. Two submarines observed a breakout attempt and, according to orders, reported enemy movements to the task force commander. Carrier aircraft destroyed the enemy battleship *Yamato*, a heavy cruiser, and four destroyers. Deceptive maneuvers and indication and warning services proved the value of submarines deployed deep in the enemy littoral, close to enemy lines of operation.

The occupation of Iwo Jima in February and Okinawa in April 1945 occurred on schedule and intense bombing of the Japanese mainland commenced shortly thereafter. During the air assaults, submarines patrolled coastal areas to conduct anti-picket boat sweeps and lifeguarding services²⁷. Lifeguarding services were second in priority to commerce interdiction, yet vital to the retrieval of pilots who were hard to replace. Air mission planning included a reference point near the coasts where damaged aircraft, incapable of returning to base, ditched. Submarines conducted rescue near the reference, sometimes under fire. Two hundred and forty-seven airmen were rescued during the mainland bombing campaign, some of whom were rescued in the middle of Tokyo Bay²⁸.

Lifeguarding services were dangerous and some submarines were subjected to friendly fighter and bomber attacks by confused air crews. Admiral Lockwood convened an interservice conference in June 1945²⁹ to iron out communications and coordination problems. The conference concluded that centralized operational control of submarines was effective for attrition warfare, but unsatisfactory for multi-service operations. Local control

would improve coordination and responsiveness. After the conference, Admiral Lockwood grouped lifeguard submarines by regional boundaries and designated forward base sights to coordinate operations. Representatives of air force and submarine components, for the first time, formed joint staffs at the base sights, and coordination improved.

The combined efforts of air and submarine units destroyed the remnants of the Japanese navy by the end of June 1945. For submarines, the sector of main effort was a wolfpack penetration into the Sea of Japan, codenamed Operation Barney, via the heavily patrolled Tsushima Straits. Wolfpacks equipped with frequency modulated sonar and mine cable clearing wires successfully penetrated an extensive minefield and entered the Sea of Japan. Submarines expertly synchronized their attacks and the toll on enemy ships was devastating. Within two weeks, twenty-eight ships were sunk for a total 54,784 tons and the event is hailed as the most successful submarine operation of the war³⁰.

By July 1945, Operation Barney and the efforts of the air-sea blockade cut the last remaining supply route from China to Japan, effectively reducing seagoing commerce to a trickle³¹. Submarines used deck guns and new topside mounted small rocket systems to attack Japanese coastal installations³² to further weaken the Japanese defenses prior to Operation Downfall. The damage to the enemy was meager, and in essence, the efforts were nothing more than harassment in lieu of hunting commerce. Nevertheless, the concept of strike warfare from submarines in coastal regions was made credible. In retrospect, the submarine shore strikes were for naught, because the employment of the atomic bomb in August forced the capitulation of the Japanese resistance. Consequently, national leaders cancelled Operation Downfall.

V. Visions of Future Submarine Littoral Warfare

Is submarine littoral warfare as important today as it was during the Pacific War? The concept of operational maneuver from the sea today is remarkably similar to that of the Pacific island hopping campaign--the projection of power from coastal regions. Historical submarine coastal services are the essence of submarine littoral applications today. There is not a single function that will justify their worth, but collectively, submarines provide a variety of services to operational commanders, making them an adaptable force multiplier. The historical submarine coastal services of the Pacific War have evolved into the following applications today:

- * Information Warfare
- * Joint Special Warfare
- * Operational Protection
- * Search and Rescue
- * Strike Warfare

Information Warfare

Information warfare is the application of an array of electronic assets to disrupt the enemy and enhance our own political, economic, and military information networks. This type of warfare, that started with beach reconnaissance and evolved from Cold-War intelligence gathering methods, is interactive in a hot-war scenario and takes a more passive role in operations other than war. Signal intelligence (SIGINT), communications intelligence (COMINT), electronics intelligence (ELINT), and electronic countermeasures (ECM) equipment and personnel may augment onboard systems to manipulate specific information. Present systems are functional, but timely submarine data exchange and

processing is restricted by too few communication channels and antiquated equipment. Communication suites require a larger data bandwidth to exploit the submarine potential. Nevertheless, joint commanders can place a submarine in the enemy's backyard to gather intelligence or electronically manipulate the information sphere without their knowledge or ability to counter. Improvement is near; the new EHF defense communication satellites (MILSTAR) will enlarge data bandwidth. Additionally, most submarine communication suites have been upgraded with multi-channel processing.

Submarines become a force multiplier when organic sensor data is readily available to warfare commanders. The goal is to fuse data from all available sensors in the coastal region, especially from a forward deployed submarine, to create a three-dimensional battlespace picture. This will embellish the operational commander's ability to employ joint forces in the littoral. As previously discussed, limited submarine communication channels become quickly saturated. This forces submarines to sacrifice security by operating for long durations at periscope (communication) depth. Moreover, lack of system interoperability with joint equipment creates data transfer problems. High speed computer connectivity with the joint commander's command and control system is crucial and submarines have joined the cooperative effort to improve in this area. Interoperability for naval platforms has improved with the Joint Operations Tactical System (JOTS), and future joint interoperability will improve when submarines join the new Global Command and Control System (GCCS)³³.

Joint Special Warfare

In coastal regions, submarines provide a covert insertion capability for special forces. Seal Team or other ground forces delivered from submarines can spearhead a variety of

missions including battle damage assessment, unconventional warfare, direct action, special reconnaissance, rescue, and psychological operations³⁴. The clandestine nature of submarines adds a dimension of safety that other platforms cannot guarantee. Although only a few submarines are configured for swimmer delivery from dry dock shelters, all submarines have delivery capability. Helicopters can insert special forces onto submarine decks by fastrope--a method to rapidly transfer men and material by rope. After transit to coastal delivery points, submarine quick surface and dive procedures are conducted to rapidly deploy special forces to the coast via small craft. Deep Rescue Vehicle technology will soon eliminate the disadvantages of submarine surfacing by deploying special forces while submerged³⁵.

Operational Protection

Naval Expeditionary Forces operating in the littoral require protection against coastal seaborne threats. Most regional powers have a diesel submarine and/or coastal missile boat capability. The protection of task forces from seaborne threats requires a coordinated effort by National Intelligence assets, Maritime Patrol Aircraft (MPA), Battlegroup anti-submarine warfare (ASW) and anti-surface ship warfare (ASUW) platforms, submarines, and Mobile Inshore Undersea Warfare Units³⁶ (MIUWU). Outer perimeter MPA and submarine sanitization along with a close-in Battlegroup ASW and ASUW screen poses a formidable defense posture against seaborne threats. Land based MIUWU conducts inshore and shallow water surveillance by using special sonobouy and radar systems. These units can provide target information to in-situ submarines for prosecution. Maintaining close reigns on the enemy submarine and missile boat threat is crucial to the safety of joint forces in the littoral and submarines are an integral part of the cooperative effort.

U.S. submarines can reasonably counter the diesel submarine and small missile boat threat with present combat system suites and tactical doctrine. Submarines are particularly suited to prosecute diesel submarines because they operate in the same environment. Moreover, submariners are well trained in ASW--their primary function during the Cold-War. New tactical doctrine is addressing nuclear submarine employment in the difficult acoustic environment of coastal regions. "Rest of the World" diesel submarines, most ill-equipped to deal with nuclear submarines, are vulnerable to prosecution by U.S. nuclear submarines with advanced sonar suites. Moreover, submarine launched Harpoon missiles may interdict small gunboats or surfaced diesel submarines. Track data may be obtained from organic sensors or third party systems. Another option is to transfer target data by tactical data link to other platforms for prosecution.

Submarines offer additional forms of task force protection, such as coastal mining, mine location, and indication and warning (I&W). Mining in harbors with submarine launched mobile mines (SLMM) or in deeper areas with captor mines (MK 60) restricts the enemy's ability to maneuver by making approach corridors impassable, similar to the mining program of the Pacific War. Since submarine mining is clandestine in nature, psychological effects of "deceptive-mining" may create the same strategic result. Submarine mining, neglected during the Cold-War, has undergone a dramatic resurgence and is now a standard part of tactical readiness. To ensure task forces are in safe water, submarine sonar systems can reasonably detect mines even in the difficult acoustic regions of shallow water. I&W is another form of operational protection that is passive in nature. Forward positioned submarine indication and warning nodes can alert the JTF of hostile intentions or hostile attack.

Search and Rescue

Combat search and rescue (CSAR) in enemy territorial waters is extremely dangerous and may require the clandestine posture of a submarine. Just as WWII fleet boats rescued downed airmen near Pacific islands, the submarine can rapidly respond (depending on weather) to pilots in distress. Submarines may accomplish rescues directly or by special rescue team insertion and extraction. Instruments such as hand-held Global Positioning System (GPS) and infrared locating devices have enhanced this capability. When the risks to an air rescue team are unacceptable, the submarine offers an alternate option.

In operations other than war, submarines may conduct Non-combatant Extraction Operations (NEO) on a limited scale. Special force teams³⁷ in fast boat or coastal patrol craft (PC) may very rapidly ferry out non-combatants to submarines when other means are impractical. This option is reserved for in-extremis situations and requires fair weather.

Strike Warfare

Tomahawk Cruise Missiles have replaced deck guns and small rocket systems used on WWII fleet boats. Fast attack submarines can deliver smart ordnance with high accuracy from a covert posture. This capability, manifested during Operation Desert Storm, provides the CJTF the ability to project power ashore at the time and location of his choosing despite the enemy littoral threat.

Critics argue that less than full time communications with submarines will create unacceptable missile employment delays. There is no doubt that immediate communication with submarines is vital in a dynamic maneuver warfare scenario, where timing is crucial. Bellringer systems³⁸, such as probe alert, have improved submarine responsiveness by providing a quick communication capability with submerged units. Nevertheless, inherent

communication restrictions are a valid concern. In the grand scheme of littoral warfare, where submarines operate with near impunity, less than full time communications is a fair tradeoff. Soon deep water communication systems, such as two-way floating wire systems, will alleviate the problem.

VI. Counter-argument: Submarine littoral warfare is not feasible nor cost effective.

Undoubtedly, a nuclear submarine must adapt to the shallow water region. With special navigation procedures including the incorporation of GPS, today's submarine can safely navigate coastal areas. But even more dangerous than natural hazards are the many enemy defense systems, available to even third world countries, that are poised against forces operating in the littoral. In a benign environment, the risk is small, substantiating the thought that less expensive surface and air platforms can perform the same tasks as submarines, perhaps even better. But in a hostile environment against a formidable adversary, submarines have the advantage. The vulnerability of submarines to satellite imagery, ELINT, infrared imaging systems, and digital phased array radar systems is far less than that of surface units. Opposing viewpoints often disregard the advantage of submarine covertness, sustainability, and survivability deep in enemy home waters. After all, clandestine operations were the forte of nuclear submarines during the Cold-War. In a hostile coastal region, the stealthy submarine, despite cost, will serve the CJTF well.

VII. Operational Control of Submarines

Submarines are more than an independent intelligence asset or a naval battlegroup strike asset; they are instruments of the joint commander and must be responsive to his needs. Since the Pacific War and throughout the Cold-War, submarines have been subject to

centralized operational and administrative control by the type commander (TYCOM). TYCOMs have promoted independent submarine operations, with little two-way communication³⁹, to maintain submarine initiative during sensitive operations and also to prevent disclosing submarine locations to enemy ELINT resources. But in a dynamic maneuver warfare scenario, the CJTF must maintain close reigns on submarines. This requires frequent communication and direct operational control (OPCON) to ensure responsive and effective submarine employment. This paradigm requires the submarine force to make a difficult choice.

The question is: Should submarines be placed under direct CJTF control or under centralized TYCOM control? To preserve the unity of command, a crucial principle of war, CJTF OPCON is prudent. On the other hand, waterspace management⁴⁰ and prevention of mutual interference⁴¹ issues warrant centralized TYCOM involvement to prevent collision or friendly fire between submarines that are geo-located. The best resolution grants OPCON to the CJTF who delegates waterspace management to a competent submarine assistance team within his staff. When joint forces are engaged in maneuver warfare, the coordination advantages of unity of command are crucial to the effective and safe employment of forces. Centralized control should be reserved for attrition warfare where collectively submarines are engaged in a unity of effort to destroy enemy commerce. This point was verified in the Pacific War when incidents of friendly fire between aircraft and submarines were reduced and coordination improved after OPCON of submarines for lifeguarding was exercised by a joint staff rather than from COMSUBPAC headquarters⁴². Today, submarines are frequently placed under CJTF OPCON and they are quickly adapting this method of command and control.

VIII. Conclusion

Submarines maintain a significant role in today's national security strategy. Submarine littoral warfare is feasible--verified by historical precedent and reconfirmed by contemporary application. The risks to submarines are minimal because of their clandestine nature and defensive capabilities. But most importantly, submarine littoral warfare is a versatile tool for the joint commander. Submarines fulfill the joint commander's need for information, force protection, and power projection ashore. To enhance their service to the CJTF submarines should

- * focus on development of littoral warfare doctrine.
- * resolve operational control and waterspace management issues in order to improve responsiveness to the joint commander.
- * improve system interoperability and enlarge data transfer bandwidth to exploit submarine information warfare capabilities.
- * integrate submarine combat and communications systems with other services and coalition forces to fuse organic data into the CJTF's operational battlespace picture.
- * prepare to engage littoral threats to protect task forces in theater.
- * prepare to engage the blue water naval threat and conduct commerce interdiction, should the need emerge in the realm of an uncertain future.

Submariners must be open-minded, engaged, and ready to respond to the needs of the joint commander. The submarine is not a relic of the Cold-War, but a capable instrument of maneuver warfare.

ENDNOTES

1. U.S. Department of the Navy, *FORWARD... FROM THE SEA*, White Paper (Washington D.C.: 1994), p. 2.
2. Office of the President of the United States, *A National Security Strategy of Engagement and Enlargement*, White Paper (Washington: U.S. Govt. Print. Off., 1994), pp. 5-20.
3. Maneuver Warfare: A philosophy that seeks to collapse the enemy's cohesion and effectiveness through a series of rapid, violent, and unexpected actions that create a turbulent and rapidly deteriorating situation, with which he cannot cope. Department of the Navy, *Naval Doctrine Publication 1, Naval Warfare* (Washington D.C.: 1994), p.74.
4. Unrestricted submarine warfare was ordered by the President and directed by the Chief of Naval Operations on December 7, 1941. Theodore Roscoe, *Submarine Operations in WWII* (Annapolis, M.D.: Naval Institute Press, 1949), p. 18.
5. Samuel Eliot Morison, *The Two-Ocean War* (Boston: Little Brown and Company, 1963), pp. 496, 497.
6. Roscoe, p. 444.
7. Statistical Summary. Roscoe, p. 523.
8. Submarine war patrol statistics. Clay Blair Jr., *Silent Victory, The U.S. Submarine War Against Japan* (Philadelphia: J.B. Lippincott Company, 1975), pp. 941-952.
9. Remaining Japanese ships in January 1945 were forced to operate in the confined waters of the Sea of Japan or the Yellow Sea, running very close to shore and holing up in harbors at night, making it almost impossible for submarines to get at them. Blair, p. 794.
10. Roscoe, p. 445.
11. Douglas MacArthur, *Report of Allied Operations in the Southwest Pacific Area* (Washington D.C.: 1948), p. 359.
12. Ibid., p. 393.
13. Ibid., p. 359.
14. Ibid., p. 391.
15. Blair, pp. 820-847.
16. Edwin P. Hoyt, *How They Won the War in the Pacific. Nimitz and His Admirals* (New York: 1970), p. 492.
17. On April 12, 1945, *USS Tirante*, in 60 feet of water and on the surface, demonstrated exceptional skill when attacking a transport off the Southwest tip of Korea. Despite having adequate shallow water torpedo. *Tirante* approached very close and successfully employed steam torpedoes to sink a merchant and two escorts. Blair, p. 818.
18. During the last days of the war, submarines roved the seas on the surface like destroyers, blasting away with deck guns at trawlers, sampans, and other small craft. Blair, p. 830.
19. Roscoe, p. 182.
20. Destruction of the Japanese Merchant Marine, Map Inserts April-June 1945. Roscoe, backfold.
21. Ibid., pp. 460, 461.
22. Ibid., pp. 520-522.
23. Blair, p. 799.

24. Ibid., p. 803.

25. To support Task Force 58 in the invasion of Iwo Jima, Admiral Lockwood ordered "Latta's Lances" to turn on searchlights at night and attack small craft to create a diversion. Ibid., p. 799.

26. Roscoe, pp. 460, 461.

27. Ibid., pp. 465-474.

28. *USS Pomfret* made a spectacular rescue of a two pilots in the middle of Tokyo Bay on February 16, 1945, with Japanese fighter planes circling overhead. This sent a strong message to pilots, and as quoted from a news column by Ernie Pyle; "Even if you were shot down in Tokyo Harbor, the Navy would be in to get you." Blair, p. 801.

29. Roscoe, pp. 472, 473.

30. Blair, p. 832-840. Also see Roscoe, p. 479.

31. E.B. Potter, *Nimitz* (Annapolis: Naval Institute Press, 1976), p. 373.

32. In July, 1945, Commander Gene Fluckey, ONBOARD *USS Barb*, conducted a series of coastal attacks along the northern Japanese islands, including rocket attacks on the cities of Shiritori and Kashiho, and deck gun bombardment of the towns of Shibertoro and Chiri. Also, he successfully sent in a commando team on the east coast of Karafuto to demolish a supply train. Blair, pp. 841, 842.

33. U.S. Joint Staff, C4 Architecture and Integration Division (J-6I), *C4I For the Warrior* (Washington: U.S. Govt. Printing Off., 1993), p. 25.

34. United States Department of Defense. *United States Special Operations Forces: Posture Statement*. (Washington: 1994), p. 5.

35. General Wayne A. Downing, USA "An address," Lecture, U.S. Naval War College, Newport, RI: 23 January 1995.

36. Commander Tracy D. Connors, "The First Team," *All Hands*, September 1988, pp. 30, 31. Also see Tracy D. Connors, "Van-tastic," *Surface Warfare*, Mar/Apr 1988, pp. 26, 27.

37. *United States Special Operations Forces: Posture Statement*, p. A-2.

38. A Bellringer system is a method to communicate with a submarine submerged by electronic or acoustic means so that the submarine will quickly proceed to communications depth to receive additional instructions.

39. During the Pacific War, Admiral Lockwood did not communicate daily with his submarines, as did the Germans, and he exercised limited operational control of units once they were committed to an operation. Morison, p. 494.

40. Waterspace management: The allocation of surface and underwater spaces into areas and the implementation of agreed procedures to permit the coordination of assets, with the aim of preventing mutual interference between submarines or between submarines and other assets, while enabling optimum use to be made of all anti-submarine warfare assets. U.S. Department of Defense, *Joint Publication 1-02* (Washington: 1994), p. 411.

41. Prevention of mutual interference (PMI) is the management of waterspace to prevent the collision of submarines with other submerged equipment, such as towed acoustic arrays, or other submarines.

42. Roscoe, pp. 472, 473.

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